Antidepressant Effect of Rudraksh (*Elaeocarpus ganitrus*) on Clinically Depressed Swiss Albino Mice

A Synopsis

Submitted in

partial fulfillment for the degree

of

Doctor of Philosophy

(Life Science & Biotechnology)

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May, 2011

Introduction:

Anxiety disorders are the most common mental illness in the world and became a very important area of research interest in psychopharmacology. Interest in alternative medicine and plant-derived medications that affect the 'mind' is growing. Self administration of herbal medicines was the most popular alternative therapies to the official medicine. The use of herbal medications by physicians in Europe and Asia is becoming very common and researchers are exploring the traditional remedies to find a suitable cure for these 'mind affecting diseases'. *Elaeocarpus* commonly called as rudraksha grown in Himalayan region. *Elaeocarpus* is a genus of tropical and subtropical evergreen trees and shrubs. The approximately 350 species that are grow in the area from the Gangetic Plain in foothills of the Himalayas to South-East Asia, Nepal, Indonesia, New Guinea to Australia, Guam, and Hawaii. These trees are well-known for their attractive, pearl-like fruit which are often colorful. Rudraksha seeds are covered by an outer shell of blue color when fully ripe, and for this reason are also known as blueberry beads. The blue colour is derived not from pigment but is structural. It is an evergreen tree that grows quickly. Rudraksha tree starts bearing fruit in three to four years. As the tree matures, the roots buttress rising up narrowly near the trunk and radiating out along the surface of the ground. Rudraksha fruit is blue in color but turns black when dried. Alkaloids are reported to be the major phytoconstituents of *Elaeocarpus* these include Elaeocarpidine, Elaeocarpine and Rudrakine. Flavnoids are also reported to the phytoconstituents of *Elaeocarpus*, It includes quercetin. The aim of the study is to evaluate the effect of the alcoholic extract of *Elaeocarpus* fruits on concentration of Dopamine and Serotonin which are commonly known as antidepressants.

Dopamine was first synthesized in 1910 by George Barger and James Ewens at Wellcome Laboratories in London, England. It was named dopamine because it was a monoamine, and its synthetic precursor was 3, 4-dihydroxyphenylalanine (L-DOPA). Dopamine's function as a neurotransmitter was first recognized in 1958 by Arvid Carlsson and Nils-Åke Hillarp at the Laboratory for Chemical Pharmacology of the National Heart Institute of Sweden. Carlsson was awarded the Nobel Prize in Physiology or Medicine in 2000 for showing that dopamine is not just a precursor of norepinephrine (noradrenaline) and epinephrine (adrenaline), but a neurotransmitter as well. Dopamine is a catecholamine neurotransmitter present in a wide variety of animals, including both vertebrates and

invertebrates. In the brain, this substituted phenethylamine functions as aneurotransmitter, activating the five known types of dopamine receptors—D1, D2, D3, D4, andD5—and their variants. Dopamine is produced in several areas of the brain, including the substantia nigra and the ventral tegmental area. Dopamine is also a neurohormone released by the hypothalamus. Its main function as a hormone is to inhibit the release of prolactin from the anterior lobe of the pituitary. Dopamine is commonly associated with the reward system of the brain, providing feelings of enjoyment and reinforcement to motivate a person proactively to perform certain activities. Dopamine is released (particularly in areas such as the nucleus accumbens and prefrontal cortex) by rewarding experiences such as food, sex, drugs, and neutral stimuli that become associatedwith them. Recent studies indicate that aggression may also stimulate the release of dopamine in this way.

Secondly Serotonin or 5-Hydroxytryptamine (5-HT) is a monoamine neurotransmitter. Biochemically derived from tryptophan. Serotonin is primarily found in the gastrointestinal (GI) tract, platelets, and in the central nervous system (CNS) of animals including humans. It is a well-known contributor to feelings of well-being; therefore it is also known as a "happiness hormone" despite not being a hormone. Approximately 80 percent of the human body's total serotonin is located in the enterochromaffin cells in the gut, where it is used to regulate intestinal movements. The remainder is synthesized in serotonergic neurons in the CNS where it has various functions. These include the regulation of mood, appetite, sleep, as well as muscle contraction. Modulation of serotonin at synapses is thought to be a major action of several classes of pharmacological antidepressants.

Review of Literature:

Antibacterial activity of petroleum ether (PE), benzene (BE), chloroform (CE), acetone (AE) and ethanol (EE) extracts of dried *Elaeocarpus sphaericus* fruit was showned against gram-positive and gram-negative bacteria. The effects of 50% ethanol extract of one formulated ayurvedic product, consisting of a mixture of medicinal plant species, was investigated on central dopaminergic and serotonergic activity in rats. This showed that the active substances present in 50% ethanol extract of the ayurvedic preparation possess antidepressant activity.(Bopaiah *et al.*,2000). The petroleum ether (PE), benzene (BE), chloroform (CE),

acetone (AE) and ethanol (EE) extracts of *E. sphaericus* fruits were found to have mast-cell stabilizing activity, substantiating the efficacy of *E. sphaericus* against bronchial asthma (Singh *et al*,2000)

Fruit extract of *Elaeocarpus ganitrus* was found analgesic in mice (Almeida *et al*, 2001). A phytochemical survey to detect alkaloids was performed on extracts of 339 discrete plants parts from total of 77 species from five genera of Elaeocarpaceae. The isolation, structure determination, synthesis, chemical transformations and biological activity of indolizidine and quinolizidine alkaloids from Elaeocarpus.

Aqueous extract of *Elaeocarpus ganitrus* Roxb. seeds powder was evaluated for its antihypertensive activity in renal artery occluded hypertensive rats.(Sakat *et al,* 2009 **)**. All the fruit extracts (PE, CE, EE and WE) of *Elaeocarpus granitus* were evaluated for the antifungal activity on different fungal strains.(Singh**,** *et al***.**,2010). Anxiolytic effects was confirmed by the methanolic extract of *Elaeocarpus sphaericus* fruits at the dose of 200 mg/kg (Shah *et al*,2010)

Justification:

Nowadays depression is a common disease among urban as well as in rural community due to various reasons like not able to fulfill the expectations of others, property dispute, insufficient fund etc. In market there is number of antidepressant drugs but due to presence of synthetic chemicals they all have side effects. Naturally, Rudraksha contain some antidepressant molecules and purpose of this study is to prove the effectiveness of those molecules as an antidepressant. After studying the effectiveness that components can be used as a natural antidepressant with most effectiveness as a drug without any side effects and this will be surely beneficial for everyone.

Scope:

The present investigation will open the avenue of research in the field of traditional medicine system used to cure depression. Today 80% diseases are life style diseases and depression is one of them. The fruit extract of *Elaeocarpus* can be used to elevate the level of dopamine and serotonin in Swiss albino mice. It can be used as an alternative treatment for depression. It may

also be helpful for the welfare of mankind as anti-depressant medicine. The herbal medicines have fewer side effects as compare to the allopathic medicines. Although it is used by ancients but scientific study of this crude drug should be done.

Objectives:

1. To study the morphological characters of *Elaeocarpus* sps. in Jayoti Vidyapeeth Women's University campus, Jaipur.
2. Isolation of fruit extract from *Elaeocarpus.*
3. Pharmacological effects of fruit extract of *Elaeocarpus* in Swiss albino mice.
4. To study impact of fruit extract on behavior of Swiss albino mice.

Methodology:

1. On the basis of morphology, Rudraksha plant will be identified.
2. Fruit extraction of *Elaeocarpus ganitrus* will be done by using various solvents with the help of Soxhlet apparatus and Rotary Evaporator.
3. Effect of fruit extract of *Elaeocarpus ganitrus* on concentration of dopamine and serotonin in Swiss albino mice will be evaluated.
4. The Study of the impact of fruit extract on behavior of Swiss albino mice will be done by using different ethograms.

Place of Work and Facilities Available:

Different Laboratories of Jayoti Vidyapeeth Women's University, Jaipur i.e. Instrumentation lab, Biochemistry lab, Bioscience lab, Pharmacology Lab and Animal house including swiss albino mice will be used for present work.

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